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Essentials of Chemistry: Experimental, Descriptive, Theoretical. By RUFUS PHILLIPS WILLIAMS. Boston: Ginn & Co., 1910. Pp. ix+421. \$1.25.

In harmony with the aim of most high-school chemistry-teaching in this country, the object of this book is to put the pupil in possession of the essential facts rather than to teach him how to investigate. Whether, in the high school, it is wise to sacrifice the teaching of scientific method for the teaching of chemical fact is a question which need not here concern us.

The pupil is early introduced to atoms and molecules. Thus on p. 7 we read: "The spaces separating atoms are much greater than the atoms themselves. Lines drawn halfway between consecutive atoms of an element like hydrogen give a boundary and inclose what may be called the volume of the atom or the *atomic* volume. . . . By a law which we shall study a little later (chap. xlv), *molecular volumes* are the same for all gases. Each is twice the hydrogen-atom volume. . . ." Chemical formulae, which follow soon, are deliberately called symbols (p. 23). Whether or no this be a desirable change in nomenclature, it will cause confusion to those pupils who venture to extend their chemical reading.

The book has eighty chapters, which run mainly in pairs, an experimental chapter on any topic being followed by a descriptive chapter. This is a good arrangement. That the author is no novice in teaching facts is shown by many other good arrangements, by his employment of several fonts of type, and by the numerous clear illustrations. "Properties of substances are usually tabulated, and may thus be easily memorized." In the experimental chapters many questions are set for answer in laboratory notebooks. Thus, typically, in experiment 39, the pupil, after burning magnesium in oxygen, is asked, "Ought the product of this combustion to weigh more or less than the original magnesium?" No attempt is made to settle the question experimentally. Toward the end of the book time is apparently too short for any experiment, but the facts are given in seventeen uninterrupted descriptive chapters. The presentation is interesting and the information seems to be in general accurate, although occasionally loose statements are found, as on p. 251: "Carbonic acid is also used for bread-making, . . . and is employed very extensively in the alkali manufacture, for example, in Na_2CO_3 "; and on p. 298: "Below 600° the iodine molecule has two atoms; above that, one atom."

There is no doubt that the book will successfully meet the needs of many teachers; and the character of these needs, rather than the author, is largely to blame for what faults the book may possess.

Progressive Problems in General Chemistry. By CHARLES BASKERVILLE and W. L. ESTABROOKE. Boston: D. C. Heath & Co., 1910. Pp. vi+243.

This little book is a compilation of problems from such various sources as "college examinations (American, European, and Australian), regents' examinations, College Entrance Examination Board papers, textbooks of all kinds," and from the various books on chemical calculations. It includes also many original problems.

According to their subjects, the problems are distributed into fourteen chapters, some of which, nevertheless, remain sufficiently miscellaneous. The total number of problems (which, if the reviewer's arithmetic has successfully stood the strain, is 2,497) "is sufficiently great to admit of the use of the book a number of years before solutions of the problems may be handed down from one class to another." In the compilation of this large number, one would expect evidence of haste. One finds it in the

headings of the odd pages 181-223 inclusive, which should read "miscellaneous," not "systematic," review. The work, however, may not have been corrected in page proof.

Many teachers will find it simpler to invent their own problems, especially as no answers are here given. Students reviewing will also require answers. Let us in patience, therefore, await the time when Messrs. Baskerville and Estabrooke, having asked these many questions, may in due course answer them.

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Second Course in Algebra. By HERBERT E. HAWKES, WILLIAM A. LUBY, and FRANK C. TOUTON. Boston: Ginn & Co., 1911. Pp. vi+264. \$0.75.

This book was planned to review the topics treated in the author's *First Course in Algebra* and to present those additional subjects considered necessary for the best secondary schools. Though the review is brief, it covers all the essential points and gives each topic a broader treatment than was possible in a first course. There is much new material, including biographical and historical notes, graphs for purposes of illustration, problems based on geometry and physics, and some real applied problems.

As it was the desire of the authors to relieve the teacher of much of the work of explanation, the explanations are very full and there are many illustrative examples. The treatment of ratio, proportion, and variation is unusually clear and comprehensive, and it includes a good list of practical problems. The authors seem to have fulfilled their desire "to produce a text that is modern, lucid, mathematically correct, and interesting," and it can be commended to teachers who wish to use a modern but conservative textbook.

H. E. COBB

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Elements of Applied Mathematics. By HERBERT E. COBB. Boston: Ginn & Co., 1911. Pp. viii+274.

This book represents a new type of mathematical textbook for this country. It also represents the latest and best ideas and ideals in the teaching of mathematics. Whether in use the book will prove satisfactory for teachers generally can be told only by experience. Mimeographed copies of it, as stated in the preface, have been used for several years, so that presumably all its exercises have been carefully tested.

The book can be put to either of two uses: it can be employed as a regular textbook, although, consisting largely of sets of problems, it does not fit into American conditions very well for such use; or it can be used as a supplementary exercise book. We have seen the idea of the use in schools of supplementary texts in reading literature, and history grow rapidly in this country within the past quarter of a century; but the definite use of supplementary textbooks in mathematics and science may strike readers as something of a novelty. In Germany the exercise books in mathematics, of course, have a well-established place, and it is likely the trend will be toward them more and more in this country.

By cutting the first year's course in algebra here and there, and more especially by omitting the more complicated and difficult exercises—with none of the essentials suffering—the algebra can be enriched by adding to the required work the earlier